

Application Number 10/650,121  
Response to Office Action mailed August 3, 2007

### **REMARKS**

This Amendment is responsive to the Office Action dated August 3, 2007. Applicant has amended claims 1, 3, 9, 16, 18, 24, 31, 33, 55 and 56. Claims 1-57 remain pending upon entry of this Amendment.

#### **Objection to the Specification**

The Office Action objected to the Applicant's Specification because on page 4, line 4, line 14, and line 21, reference character 22 has been used to designate "the reduced set of input features or reduced kernel functions," "the reduced set of input features or kernel functions," and "input features." Applicant has amended paragraph [0018]-[0022] and [0024] to clarify that reference number 22 refers to the reduced input set that may include input features or kernel functions. No new matter has been added by way of this amendment. Applicant respectfully requests that the Examiner withdraw the objection to the Specification in view of the Amendment.

#### **Claim Rejection Under 35 U.S.C. § 103**

In the Office Action, the Examiner rejected claims 1-5, 7-20, 22-35, 37-45 and 55-56 under 35 U.S.C. § 103(a) as being unpatentable over "A Newton Method for Linear Programming," by O.L. Mangasarian, Data Mining Institute Technical Report 02-02, March 2002 (hereinafter Mangasarian) in view of "Data Selection for Support Vector Machine Classifiers," by Glenn Fung et al., Data Mining Institute Technical Report 00-02, February 2000 (hereinafter Fung) and rejected claims 6, 21, 36, 46-54 and 57 under 35 U.S.C. § 103(a) as being unpatentable over Mangasarian in view of Fung and further in view of "Finite Newton Method for Lagrangian Support Vector Machine Classification," by Glen Fung et al., Data Mining Institute Technical Report 02-01, February 2002 (hereinafter Fung2).

Applicant respectfully traverses the rejections to the extent such rejections may be considered applicable to the claims as amended. The cited references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

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For example, Mangasarian in view of Fung fails to disclose or suggest defining a primal linear programming formulation of a support vector machine classifier, solving an exterior penalty function of a dual of the primal linear programming formulation to produce a solution to the primal linear programming formulation of the support vector machine classifier and selecting an input set for the support vector machine classifier based on the solution, as required by Applicant's claim 1 as amended.

In support of the rejection of claim 1, the Office Action characterized page 13, lines 1-3 and page 3, paragraph 2 of Mangasarian as disclosing defining a linear programming formulation of a support vector machine classifier. The Office Action further characterized page 3, paragraph 2 and page 4, lines 1-8 as disclosing solving an exterior penalty function of a dual of the linear programming formulation to produce a solution to the support vector machine classifier. The Office Action acknowledged, however, that Mangasarian fails to teach selecting an input set for the support vector machine classifier. The Office Action referenced Fung to satisfy this shortcoming. Applicant respectfully disagrees with the Office Action's characterization of the references and the application of the references to the Applicant's claims.

Mangasarian discloses a Newton method for solving linear programs.<sup>1</sup> Page 3, paragraph 2 of Mangasarian describes solving a parametric exterior penalty function of a primal linear program to produce an exact solution to the dual linear program. In particular, Mangasarian describes beginning with a primal linear program, defining an exterior penalty formulation for the primal linear program, and solving the penalty function for a solution to the dual of the primal linear program.<sup>2</sup> This is distinctly different than the requirements of Applicant's claim 1 as amended.

Mangasarian fails to teach or suggest solving an exterior penalty function of the dual of the primal linear program, as required by Applicant's claim 1 as amended. To the contrary, Mangasarian solves an exterior penalty function of the primal linear program instead of the dual. As a result, Mangasarian obtains a solution to the dual linear program instead of obtaining a solution to the primal linear program. Fung fails to cure any of the deficiencies identified above

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<sup>1</sup> Mangasarian, Abstract.

<sup>2</sup> Mangasarian, page 3, paragraph 2.

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with respect to Mangasarian. In fact, Fung fails to describe solving an exterior penalty function at all.

Applicant's independent claim 16 is directed to a classification system and requires a processor that applies a primal linear programming formulation of a support vector machine classifier to classify data based on an input set and an input module that generates the input set based on a solution of an exterior penalty function of a dual of the primal linear programming formulation.

Applicant's independent claim 31 is directed to a computer-readable medium comprising instructions to cause a processor to define a primal linear programming formulation of a support vector machine classifier solve an exterior penalty function of a dual of the primal linear programming formulation to produce a solution to the primal linear programming formulation of the support vector machine classifier and select an input set for the support vector machine classifier based on the solution.

Applicant's independent claim 55 is directed to a support vector machine classification system that includes a data storage medium storing input data for classification, a support vector machine classifier that classifies the input data into a first set of data and a second set of data based on a set of input features and a selection module that produces a reduced set of input features for the support vector machine classifier based on a minimization of an exterior penalty function of a dual of a primal linear programming formulation of the linear support vector machine classifier for a finite value of a penalty parameter.

For the reasons set forth above with respect to claim 1, Mangasarian in view of Fung fails to teach or suggest at least some of the requirements of Applicant's independent claims 16, 31 and 55. In view of the glaring deficiencies of Mangasarian and Fung, Applicant reserves comment regarding the application of the references to the dependent claims. Applicant does not, however, acquiesce in the Office Action's interpretation of Applicant's dependent claims or the application of the references to the Applicant's dependent claims. For at least these reasons, the applied references fail to establish a prima facie case for non-patentability of Applicant's claims 1-57 under 35 U.S.C. § 103(a). Applicant respectfully requests withdrawal of these rejections.

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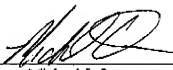
### CONCLUSION

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

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November 26, 2007  
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